AF

TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No. LWEP:119US

In re Application Of: **Ralf KRUEGER**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/605,492	October 2, 2003	Joshua L. PRITCHETT	24041	2872	2491

Invention: **PHASE SHIFT METHOD AND APPARATUS FOR IMPLEMENTING PHASE-CONTRAST OR MODULATION-CONTRAST OBSERVATION ON MICROSCOPES**

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Dated: **January 23, 2006**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent Application No.: 10/605,492 Confirmation No.: 2491

Applicant(s): KRUEGER, Ralf

For: **PHASE SHIFT METHOD AND APPARATUS FOR IMPLEMENTING PHASE-CONTRAST OR MODULATION-CONTRAST OBSERVATION ON MICROSCOPES**

Filed: October 2, 2003

TC/Art Unit: 2872

Examiner: PRITCHETT, Joshua L.

Docket No.: LWEP:119US

Customer No.: 24041

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C. Paul Maliszewski
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BRIEF ON APPEAL UNDER 37 C.F.R. § 41.37

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Honorable Sir:

Appellant respectfully appeals the decision of the Primary Examiner to finally reject Claims 1-3 and 8-13, as set forth in the Final Office Action dated October 4, 2005.

A **Claims Appendix** follows Page 19 of this paper.

An **Evidence Appendix** follows Page 21 of this paper.

REAL PARTY IN INTEREST

The real party in interest is Leica Microsystems Wetzlar GMBH, Assignee of the above application by assignment recorded in the Patent and Trademark Office at Reel 014098, Frame 0742.

RELATED APPEALS AND INTERFERENCES

Upon information and belief, no appeals or interferences are known to Appellant, which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF CLAIMS

Claims 1-3 and 8-13 are currently subject to examination.

Claims 4-7 are cancelled.

Claims 1-3 and 8-13 stand as finally rejected.

Claims 1-3 and 8-13 are the subject of this Appeal.

STATUS OF AMENDMENTS

There are no amendments filed subsequent to final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates generally to microscopy, specifically to phase-contrast and modulation-contrast microscopy, and more specifically to phase-contrast and modulation-contrast microscopy using a tiltably mounted modulator arranged in the observation beam path and a stop arranged in the illumination beam path.

Claim 1

Claim 1 recites an apparatus for implementing phase-contrast or modulation-contrast observation on microscopes. (See generally Page 1, Lines 8-12; Page 3, Lines 5-9). The apparatus includes modulator **7** arranged in each pupil plane in the observation beam path and stop **3** arranged

in the illumination beam path. (Fig. 1, Reference Nos. **3** and **7**; Page 5, Lines 2-11). Modulator **7** includes at least one layer modifying the phase or amplitude and modulator **7** is mounted tiltably. (Fig. 2, Reference No. **7**, **10**, **11** and **12**; Fig. 3, Reference No. **7** and **14**; Page 3, Lines 13-19; Page 5, Lines 12-22). Mechanical tilting apparatus **14** varies the tilt angle of modulator **7**, whereby phase shifts from zero-order diffraction to higher diffraction orders are provided. (Fig. 3, Reference Nos. **7** and **14**; Page 3, Lines 13-19; Page 5, Lines 17-22). At least a portion of the at least one layer modifying the phase or amplitude is transmissive. (Fig. 2, Reference Nos. **10** and **11**; Page 5, Lines 12-16).

Claim 11

Claim 11 recites an apparatus for implementing phase-contrast or modulation-contrast observation on microscopes. (See generally Page 1, Lines 8-12; Page 3, Lines 5-9). The apparatus includes modulator **7** arranged in each pupil plane in the observation beam path and stop **3** arranged in the illumination beam path. (Fig. 1, Reference Nos. **3** and **7**; Page 5, Lines 2-11). Modulator **7** includes at least one layer modifying the phase or amplitude. (Fig. 2, Reference No. **7**, **10**, **11** and **12**; Fig. 3, Reference No. **7** and **14**; Page 3, Lines 13-19; Page 5, Lines 12-22). The apparatus further includes optical polarization means in combination with retardation plates for phase shifting. (Page 4, Lines 8-9). At least a portion of the at least one layer modifying the phase or amplitude is transmissive. (Fig. 2, Reference Nos. **10** and **11**; Page 5, Lines 12-16).

Claim 12

Claim 12 recites an apparatus for implementing phase-contrast or modulation-contrast observation on microscopes. (See generally Page 1, Lines 8-12; Page 3, Lines 5-9). The apparatus includes modulator **7** arranged in each pupil plane in the observation beam path and stop **3** arranged in the illumination beam path. (Fig. 1, Reference Nos. **3** and **7**; Page 5, Lines 2-11). Modulator **7** includes at least one layer modifying the phase or amplitude. (Fig. 2, Reference No. **7**, **10**, **11** and **12**; Fig. 3, Reference No. **7** and **14**; Page 3, Lines 13-19; Page 5, Lines 12-22). Various modulators

are arranged on a carrier in a manner introducible into the beam path of the microscope and are selectably mounted, tiltably individually or tiltably together with the carrier, on that carrier. (Page 2, Lines 8-16; Page 4, Lines 10-14). At least a portion of the at least one layer modifying the phase or amplitude is non-reflective. (Fig. 2, Reference Nos. **10** and **11**; Page 5, Lines 12-16).

Claim 13

Claim 13 recites a method for implementing a defined phase shift in the implementation of phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in each pupil plane in the observation beam path and containing at least one layer modifying the phase or amplitude, and of a stop arranged in the illumination beam path of the microscope. (See generally Page 1, Lines 8-12; Page 3, Lines 5-9; Fig. 1, Reference Nos. **3** and **7**; Page 5, Lines 2-11). At least a portion of the at least one layer modifying the phase or amplitude is transmissive. (Fig. 2, Reference Nos. **10** and **11**; Page 5, Lines 12-16). The method includes the step of tilting the modulator to impart a defined phase shift. (Fig. 3, Reference No. **7** and **14**; Page 3, Lines 13-19; Page 4, Lines 15-20; Page 5, Lines 17-22).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1) Whether Claims 1, 2, 8, 9, and 11-13 are novel under 35 U.S.C. § 102(e) and therefore patentable over U.S. Patent No. 6,687,052 (Wilson et al.)?

2) Whether Claims 3 and 10 are non-obvious under 35 U.S.C. §103(a) to a person having ordinary skill in the art at the time the invention was made and therefore patentable over U.S. Patent No. 6,687,052 (Wilson) in view of U.S. Patent No. 6,057,894 (Kobayashi)?

ARGUMENT

1) Whether Claims 1, 2, 8, 9, and 11-13 are novel under 35 U.S.C. § 102(e) and therefore patentable over U.S. Patent No. 6,687,052 (Wilson et al.)?

a) Summary of the Rejection:

The Examiner rejected Claims 1, 2, 8, 9, and 11-13 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,687,052 (Wilson et al.). More specifically, the Primary Examiner asserted:

> Regarding Claims 1 and 11-13, Wilson et al. disclose an apparatus for implementing phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in each pupil plane in the observation beam path and containing at least one layer modifying the phase or amplitude, and a stop arranged in the illumination beam path wherein the modulator is mounted tiltably and wherein at least a portion of the at least one layer modifying the phase or amplitude is transmissive. Regarding Claim 11, Wilson et al. further disclose the use of retardation plates used in combination with polarization modulation. Regarding Claim 12, Wilson et al. further disclose a carrier introducible into the beam path of the microscope and selectably mounted tiltably mounted, and the use of a pattern of modulators on the mask, which the Examiner interprets as various modulators.

Appellant respectfully requests reversal of the Primary Examiner's rejection of Claims 1, 2, 8, 9 and 11-13 for the reasons set forth herebelow.

b) Brief description of the reference cited by the Examiner

1) Wilson et al.

Wilson et al. teach a confocal microscope with two matched light sources: a first light source (1) and a second light source (8). The light sources (1,8) are arranged to illuminate opposite sides of a modulating mask (6). The light either reflecting from or passing through the modulating mask (6) is then used to illuminate an object O supported on a mount (5). The microscope is arranged so that the object O is mounted on the opposite side of the mask (6) to a camera (7) such that light reflected from the object O passes through the modulating mask (6) before being captured by the camera (7). Subtraction of the image produced using the second light source (8) from the image produced using the first light source (1) generates a confocal image that contains substantially less noise than is possible with available confocal microscopy apparatus.

The at least one mask is arranged to encode light incident on the specimen and decode the light reflected by the specimen thereby creating a first image of the specimen consisting of superimposed confocal and non-confocal images. Further encoding means is provided to encode light to or from the specimen in reverse with respect to the encoding of the at least one mask thereby creating a second image consisting of a non-confocal image. Subsequently, the second image is 'subtracted' from the first image and the resultant image is only the confocal image contained within the first image.

c) Arguments regarding the rejection of Claim 1

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Appellant courteously submits that Wilson et al. do not teach a stop arranged in the illumination beam path, a modulator mounted tiltably or a modulator arranged in the observation beam path. Furthermore, "the identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, *i.e.*, identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). Again, Appellant respectfully submits that not only are the elements not arranged as required by the claims, but Wilson et al. lacks essential elements of Claim 1, *i.e.*, a stop arranged in the illumination beam path, a modulator mounted tiltably and a modulator arranged in the observation beam path.

1) Wilson et al. do not teach a stop arranged in the illumination beam path

Claim 1 of Appellant's application recites: "a stop arranged in the illumination beam path," while Wilson et al. do not teach a stop within any part of their apparatus. However, in the November 7, 2005 Advisory Action, the Examiner stated: "Applicant further argues that the Wilson reference lacks a stop. Borchard (2004/0212877) states that every lens inherently has a maximum aperture and can therefore act as a stop (para. 0039). The lens (4) would act as a stop because it would limit the

area of light that can incident the object."

Appellant agrees that United States Patent Application Publication No. 2004/0212877 (Borchard) states that every lens has physical apertures that limit the passage of energy to the image, and that each lens element has a limited clear aperture, as do baffles in the lens. (Para. **[0039]**). However, Appellant courteously submits that Borchard continues by stating that one of those apertures, *i.e.*, the clear aperture or the baffle, will most limit the diameter of the cone of energy that the lens can pass to the image. (Para. **[0039]**). *This aperture is termed the aperture stop.* (emphasis added) (Para. **[0039]**). Understanding the difference between a lens and a lens element is essential to understanding Borchard. A 'lens' is a transparent optical component consisting of one or more pieces of optical glass with surfaces so curved (usually spherical) that they serve to converge or diverge the transmitted rays from an object, thus forming a real or virtual image of that object. (See Exhibit A). While a 'lens element' is a sub-component that is part of a lens, *e.g.*, a plano-convex lens element, a stop, etc.. A lens, for example, may be a camera lens comprising a plurality of lens elements, apertures, diaphragms, etc.. In this example, and in all other lenses, there is an aperture that most limits the passage of energy to the image, *i.e.*, the aperture stop. (See Exhibit B). The aperture stop may be a lens element, lens mount or any other element within the optical path, as an aperture is merely an opening or hole through which radiation or matter may pass. (See Exhibit C). However, the aperture stop is **always** the opening that most limits the passage of energy. The position of an aperture stop may have a large effect on the image resulting from a lens. Thus, an aperture stop position is often chosen based on lens design constraints.

Appellant's Claim1 recites: "a stop arranged in the illumination beam path," *i.e.*, an element arranged in a specific location not contained within the cited reference. Contrarily, Wilson et al. do not disclose a stop or an aperture within their optical system. No information regarding the opening that most limits the passage of energy is provided. In fact, there is not teaching that light is limited by any portion of the Wilson et al. device. Therefore, one of ordinary skill in the art would be unable to determine whether a stop is present within the Wilson et al. device. Specifically, whether lens (4) acts as a stop. As stated *supra*, the elements must be arranged as required by the claim. *In re Bond*,

910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). However, Wilson et al. do not teach the arrangement of Appellant's Claim 1, and therefore can not anticipate Claim 1.

Moreover, extrinsic evidence may be used to explain but not expand the meaning of terms and phrases used in the reference relied upon as anticipatory of the claimed subject matter. *In re Baxter Travenol Labs.*, 952 F.2d 388, 21 USPQ2d 1281 (Fed. Cir. 1991). Appellant respectfully submits that Examiner is attempting to impermissibly expand the meaning of lens to incorporate aperture stop. As stated in *In re Baxter Travenol Labs.*, extrinsic evidence may not expand the meaning of a term, as Examiner has done by utilizing the teachings of Borchard. Appellant acknowledges that "to serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence. Such evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). And as Appellant has shown above, Wilson et al. is silent regarding a stop and/or an aperture, and Borchard does not make clear that the missing descriptive matter is necessarily present in the Wilson et al. teaching, or that it would be recognized by persons of ordinary skill.

2) Wilson et al. do not teach a tiltable element

Claim 1 recites: "An apparatus for implementing phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in each pupil plane in the observation beam path and containing at least one layer modifying the phase or amplitude, and of a stop arranged in the illumination beam path, wherein *the modulator is mounted tiltably*..." (emphasis added). In the November 7, 2005 Advisory Action, the Examiner stated: "There is no mention in the claims that dynamic movement of the modulator is required. The term tilt means a sloping surface. Tiltable means capable of being tilted, therefore tiltable means capable of having a sloping surface. As shown by Fig. 1 of Wilson the modulator is capable of having a sloping surface with respect to both the illumination and observation axes."

Appellant acknowledges that one of the noun forms of the word 'tilt' means: 'a sloping

surface.' However, Appellant respectfully submits that the adverb tiltably and the adjective tiltable are both derived from the verb form of the word 'tilt'. (See Exhibit D). The verb form means either to cause to have an inclination, or to move or shift so as to lean or incline. Thus, in view of the appropriate definition, mounted tiltably means mounted in such a fashion as to be capable of being caused to have an inclination. In short, if an element is mounted tiltably, that element is capable of being caused to have an inclination. If an element is mounted at a fixed angle, as in Wilson et al., it does not follow that the element is mounted tiltably as a **fixed** element is not capable of **being caused** to have an inclination.

Furthermore, the Examiner stated: "[t]iltable means capable of being tilted, therefore tiltable means capable of having a sloping surface." The Examiner has drawn an erroneous conclusion from the first part of the preceding sentence. Specifically, the Examiner has stated that "capable of *being tilted*," is analogous to "capable of *having* a sloping surface." (emphasis added). Another way of stating the Examiner's position is that "capable of being tilted" is the same as "tilted." "Capable of being tilted" is a dynamic condition. That is, an active step of tilting is necessarily required. On the other hand, "tilted" is a passive/non-dynamic condition. For example, Mount Everest is tilted or capable of having a sloped surface, but Mount Everest is clearly not tiltable. In short, "tiltable" and "titled" are very different terms.

Moreover, Claim 1 recites the modulator as being tiltable. Disregarding for now the definitions for tiltable and tilted, the specification of the present application clearly shows and enables a modulator that is dynamic and able to be moved and tilted.

In the first paragraph of the detailed description, Appellant discloses that "FIG. 1 depicts an arrangement according to the present invention in greatly simplified form. The light of a light source 1 is incident via a collector 2 onto a stop 3 which is arranged in the condenser pupil. Located farther along in the beam path to intermediate image 9 are condenser 4, specimen 5, an objective 6, a modulator 7 which is arranged in the objective pupil, as well as a tube lens 8. *According to the present invention, modulator 7 is arranged tiltably. Since a plurality of different mechanical solutions are known for tilting, depiction thereof was omitted.* In this specific exemplary

embodiment, stop 3 is embodied as a slit stop. Modulator 7 is a strip-shaped modulator matched thereto. Other embodiments of the stop and modulator are, of course, also possible." (emphasis added).

Additionally, in the third paragraph of the detailed description, Appellant disclosed that "*FIG. 3 shows a modulator together with a tilting apparatus.* A housing part 13 of the microscope receives modulator 7. *Tilting of the modulator is accomplished by means of a mechanical tilting apparatus 14 which can be displaced by means of an actuation element. This actuation element can be, for example, an adjusting screw or also an electric motor, a piezoelement, or any other mechanical motion element.*" (emphasis added).

Thus, the specification clearly enables the modulator recited in Claim 1 as being **moveable and dynamic**. Alternatively stated, the specification clearly shows that "tiltable" is not limited to being **statically tilted**.

Applicant agrees that Wilson et al. teach a tilted mask, but Wilson et al. only teach a mask fixedly tilted at a non-adjustable angle: "The mask 6 is *mounted* with its normal at a small angle, for example a few degrees, to the main optical axis X of the apparatus. The angle is sufficiently small that it has only a nominal effect to the final imaging of the mask pattern on the object. Where the patterning of the mask is fixed, preferably *the mask is mounted on an axle (not shown) for rotation about its normal.*" (col. 2, lines 57-63) (emphasis added). The mask is installed at an angle, and Wilson et al. are silent regarding tilting the mask once installed and/or once their system is in use. The rotation about the normal taught by Wilson et al. is not applicable to the tilt of the mask. In short, the Wilson et al. mask is tilted, not tiltable.

3) Wilson et al. do not teach a modulator in the observation beam path

Claim 1 recites: "An apparatus for implementing phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in each pupil plane in the *observation beam path* (emphasis added) and containing at least one layer modifying the phase or amplitude..." For example, Figure 1 of the instant application shows the modulator (7) between the specimen (5) and the intermediate image (9). The Examiner has cited the mask in Wilson et al. and

cited col. 3, lines 26-30 as support. Wilson et al. teach: "*Between the beam splitter 3 and the objective lens 4* (emphasis added) a mask 6 is provided across the main optical axis X of the microscopy apparatus such that a first surface of the mask 6a is illuminated by the first light source 1. The mask 6 is encoded with a predetermined pattern that modulates spatially in the plane of the mask the *light from the first light source 1* (emphasis added). The modulation may be intensity, phase or polarisation modulation." (col. 3, lines 22-30). Wilson is teaching mask 6 modulating light **in the illumination beam path**, not a modulator **in the observation beam path**.

Wilson et al. further teach that mask 6 acts not as a modulator but as a decoder in the observation beam path. "The encoded light is then reflected by the object O back through the mask 6 to the beam splitter 3. As the reflected light returns through the mask 6, the light is decoded by the patterning of the mask." (col. 4, lines 42-45). Mask 6 acts as a decoder in the observation beam path. Mask 6 does not modulate light in the observation beam path – it either passes it or blocks it. For example, if light is modulated/polarized at a first angle in the illumination beam path, mask 6 will pass light in the observation beam path polarized at this first angle and block light polarized (for example, by reaction to a specimen) at another angle.

Hence, Appellant respectfully submits that Wilson et al. fail to disclose essential elements of Appellant's invention, *i.e.*, a stop arranged in the illumination beam path, a modulator mounted tiltably and a modulator arranged in the observation beam path, such that the invention of Claim 1 would be anticipated. Similarly, Appellant respectfully submits that Wilson et al. do not disclose, teach or suggest each and every limitation of Claim 1 such that the invention of Claim 1 would be rendered obvious to one of ordinary skill in the art at the time the invention was made. In view thereof, Appellant requests that the Board reverse the Primary Examiner's rejection.

d) Arguments regarding the rejection of Claim 11

Appellant courteously asserts that Claim 11 is not anticipated by Wilson et al. for all of the reasons set forth above, and for the following reasons.

Similar to Claim 1, Claim 11 recites an apparatus for implementing phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in the observation beam path and a stop arranged in the illumination beam path, however, Claim 11 also includes an optical polarization means in combination with retardation plates used for phase shifting.

As described *supra*, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Again, Appellant courteously submits that Wilson et al. do not teach a stop arranged in the illumination beam path or a modulator arranged in the observation beam path. Furthermore, "the identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, *i.e.*, identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). Once again, Appellant respectfully submits that not only are the elements not arranged as required by the claims, but Wilson et al. lacks essential elements of Claim 11, *i.e.*, a stop arranged in the illumination beam path and a modulator arranged in the observation beam path.

Thus, for the reasons recited above regarding Claims 1 and 11, Appellant respectfully submits that Wilson et al. fail to disclose essential elements of Appellant's invention, *i.e.*, a stop arranged in the illumination beam path and a modulator arranged in the observation beam path, such that the invention of Claim 11 would be anticipated. In view thereof, Appellant requests that the Board reverse the Primary Examiner's rejection.

e) Arguments regarding the rejection of Claim 12

Appellant courteously asserts that Claim 12 is not anticipated by Wilson et al. for all of the reasons set forth above, and for the following reasons.

Again similar to Claim 1, Claim 12 recites an apparatus for implementing phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in the

observation beam path and a stop arranged in the illumination beam path, however, Claim 12 also includes that various modulators are arranged on a carrier in a manner introducible into the beam path of the microscope and are selectably mounted, tilted individually or tiltably together with the carrier, on that carrier.

In addition to failing to teach a stop arranged in the illumination beam path and a modulator arranged in the observation beam path, Wilson et al. do not teach various modulators arranged on a carrier in a manner introducible into the beam path of the microscope and are selectably mounted, tiltably individually or tiltably together with the carrier, on that carrier.

1) Wilson et al. do not teach various modulators arranged on a carrier

Wilson et al. teach a single modulating mask 6 arranged within the optical path at a fixed angle. Although the pattern of mask 6 may take several forms, this is not the equivalent of various modulators arranged on a carrier. Appellant respectfully submits that various modulators arranged on a carrier in a manner introducible into the beam path implies a plurality of modulators arranged on a single carrier, *e.g.*, a turret type carrier. As Wilson et al. merely teach a single modulator mask 6 within the optical path, it does not follow that they also teach a plurality of modulators arranged on a single carrier. Thus, Wilson et al. are lacking an essential element of Appellant's Claim 12, i.e., various modulators arranged on a carrier in a manner introducible into the beam path of the microscope.

2) Wilson et al. do not teach various modulators arranged on a carrier that may be tilted individually or tilted together with the carrier

Although Wilson et al. teach that modulating mask 6 may be mounted on an axle, thereby permitting rotation about its normal, this configuration is not equivalent to Appellant's various modulators arranged on a carrier that may be tilted individually or tilted together with the carrier. The axle taught by Wilson et al. is only taught as being a rotational axis normal to the surface. It does not follow that an axle which is fixedly mounted normal to mask 6 would also be capable of being tilted individually.

Moreover, Wilson et al. teach the mounting of mask 6 with its normal at a small angle, yet are silent regarding the dynamic adjustment of such angle. Contrarily, Appellant teaches that the carrier **may** be tilted individually or tilted together. Thus, either the modulator on its own or the modulator and its carrier may be tilted. As dynamic tilting of a modulator is taught throughout Appellant's application, this interpretation of Claim 12 is consistent with the rest of the application.

Thus, for the same reasons recited above regarding Claims 1 and 12, Appellant respectfully submits that Wilson et al. fail to disclose essential elements of Appellant's invention, *i.e.*, a stop arranged in the illumination beam path, a modulator arranged in the observation beam path, various modulators arranged on a carrier and modulators arranged on a carrier that may be tilted individually or tilted together with the carrier, such that the invention of Claim 12 would be anticipated. In view thereof, Appellant requests that the Board reverse the Primary Examiner's rejection.

f) Arguments regarding the rejection of Claim 13

Appellant courteously asserts that Claim 13 is not anticipated by Wilson et al. for all of the reasons set forth above, and for the following reasons.

In Claim 13, Appellant recites the method of implementing a defined phase shift in the implementation of phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in the observation beam path by tilting the modulator.

In view of Appellant's foregoing description regarding the dynamic tilting of a modulator arranged in the observation beam path, and Wilson et al.'s failure to disclose such an arrangement, it generally follows that a method of dynamic adjustment of a modulator angle for use in implementing a defined phase shift in the implementation of phase-contrast or modulation-contrast observation on a microscope is not anticipated by the teachings of Wilson et al.. Thus, for the same reasons recited above regarding Claims 1 and 13, Appellant respectfully submits that Wilson et al. fail to disclose essential elements of Appellant's invention, *i.e.*, a stop arranged in the illumination beam path, a modulator arranged in the observation beam path, and implementing a defined phase shift by

dynamically tilting a modulator, such that the invention of Claim 13 would be anticipated. In view thereof, Appellant requests that the Board reverse the Primary Examiner's rejection.

2) Whether Claims 3 and 10 are non-obvious under 35 U.S.C. §103(a) to a person having ordinary skill in the art at the time the invention was made and therefore patentable over U.S. Patent No. 6,687,052 (Wilson) in view of U.S. Patent No. 6,057,894 (Kobayashi)?

a) Summary of the Rejection:

The Examiner rejected Claims 3 and 10 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,687,052 (Wilson et al.) in view of U.S. Patent No. 6,057,894 (Kobayashi). More specifically, the Primary Examiner asserted:

> Regarding Claim 3, Wilson et al. teach the invention as claimed but lacks reference to the use of a glass layer. Kobayashi teaches the use of a glass layer coupled to a modulator for the purpose of supporting the modulating layer in a high heat environment. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Wilson et al. invention include the glass layer of Kobayashi for the purpose of supporting the modulating layer in a heated environment, where the heat originates from the LEDs of the Wilson et al. invention.

Appellant respectfully requests reversal of the Primary Examiner's rejection of Claims 3 and 10 for the reasons set forth herebelow.

b) The References cited by The Examiner

For purposes of providing background, Appellant briefly discusses the references cited by the Examiner.

1) Wilson et al.

Please refer to ARGUMENT Section 1(b)(1) *supra*, for a description of Wilson et al..

2) Kobayashi

Kobayashi teaches a projection type liquid crystal display comprising a dichroic prism for separating or synchronizing a light to provide fundamental colors for color display, and a unit for enlarging and projecting a transmitted light from the liquid panel. The liquid panel has one surface

fixedly attached to a transparent member and the other surface integral with the dichroic prism directly or through at least one optical component. In the projection type liquid crystal display, the light which provides fundamental colors for color display and is separated or synchronized at the dichroic prism is incident on the light incidence surface of the liquid panel through the transparent member or the dichroic prism without contacting with the air in the space. The light incident on the liquid crystal panel is irradiated from the light outgoing surface of the liquid crystal panel through the transparent member or the dichroic prism without contacting with the air in the space and thereafter enlarged and projected. With this arrangement, it is possible to simplify the structure of the peripheral optical systems of the liquid crystal panel and to improve image quality.

c) Arguments regarding the rejection of Claim 3

"To establish a prima facia case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in knowledge generally available to one having ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. *Finally, the prior art reference (or the references when combined) must teach or suggest all the claim limitations.* The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." MPEP § 2142 (citing *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991)) (emphasis added).

1) Wilson et al. fails to teach, suggest or motivate all of the elements of Appellant's Claim 1

As set forth *supra*, Wilson et al. fail to teach elements of Appellant's Claim 1, *i.e.*, a stop arranged in the illumination beam path, a modulator mounted tiltably and a modulator arranged in the observation beam path, such that the invention of Claim 1 would be anticipated. Similarly, Appellant respectfully submits that Wilson et al. do not suggest or motivate each and every limitation of Claim 1 such that the invention of Claim 1 would be rendered obvious to one of ordinary skill in the art at the time the invention was made.

2) Kobayashi fails to teach, suggest or motivate the elements of Appellant's Claim 1 not taught by Wilson et al.

As stated *supra*, Wilson et al. fail to teach a stop arranged in the illumination beam path, a modulator mounted tiltably and a modulator arranged in the observation beam path. Kobayashi is silent regarding these missing elements.

Moreover, the Examiner has not asserted that Kobayashi includes any of these missing elements. In fact, the Examiner has included Kobayashi merely to support an assertion that "[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Wilson invention include the glass layer of Kobayashi for the purpose of supporting the modulating layer in a heated environment."

For the reasons set forth above, Appellant respectfully submits that Wilson et al. and Kobayashi fail to teach, suggest or motivate each and every element of Appellant's Claim 1. Therefore, Claim 1 is patentable over Wilson et al. and Kobayashi. Claim 3, dependent from Claim 1, also is patentable over Wilson et al. and Kobayashi. In view thereof, Appellant requests that the Board reverse the Primary Examiner's rejection.

d) Arguments regarding the rejection of Claim 10

As set forth above, "To establish a prima facia case of obviousness, ... *the prior art reference (or the references when combined) must teach or suggest all the claim limitations.*" MPEP § 2142 (citing *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991)) (emphasis added).

1) Wilson et al. fails to teach, suggest or motivate all of the elements of Appellant's Claim 1

As set forth *supra*, Wilson et al. fail to teach elements of Appellant's Claim 1, *i.e.*, a stop arranged in the illumination beam path, a modulator mounted tiltably and a modulator arranged in the observation beam path, such that the invention of Claim 1 would be anticipated. Similarly, Appellant respectfully submits that Wilson et al. do not suggest or motivate each and every limitation

of Claim 1 such that the invention of Claim 1 would be rendered obvious to one of ordinary skill in the art at the time the invention was made.

2) Kobayashi fails to teach, suggest or motivate the elements of Appellant's Claim 1 not taught by Wilson et al.

As stated *supra*, Wilson et al. fail to teach a stop arranged in the illumination beam path, a modulator mounted tiltably and a modulator arranged in the observation beam path. Kobayashi is silent regarding these missing essential elements.

Again, the Examiner has not asserted that Kobayashi includes any of these missing elements. In this instance, the Examiner has included Kobayashi merely to support the rejection of Claim 3, and therefore Claim 10 due to its dependency therefrom.

For the reasons set forth above, Appellant respectfully submits that Wilson et al. and Kobayashi fail to teach, suggest or motivate each and every element of Appellant's Claim 1. Therefore, Claim 1 is patentable over Wilson et al. and Kobayashi. Claim 10, dependent from Claim 1, also is patentable over Wilson et al. and Kobayashi. In view thereof, Appellant requests that the Board reverse the Primary Examiner's rejection.

CONCLUSION

For the reasons set forth above, Appellant respectfully submits that Claims 1, 2, 8, 9 and 11-13 are novel under 35 U.S.C. § 102(e) and therefore patentable over U.S. Patent No. 6,687,052 (Wilson et al.). Additionally, Appellant respectfully submits that Claims 3 and 10 are non-obvious under 35 U.S.C. § 103(a) to a person having ordinary skill in the art at the time the invention was made and therefore patentable over U.S. Patent No. 6,687,052 (Wilson et al.) in view of U.S. Patent No. 6,057,894 (Kobayashi). Accordingly, Appellant prays that this Honorable Board will reverse the Primary Examiner's rejection of Claims 1-3 and 8-13.

Respectfully submitted,

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Dated: January 23, 2006
CPM/RCA
Attachment

CLAIMS APPENDIX

Reprinted herebelow are the claims involved in this appeal:

1. An apparatus for implementing phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in each pupil plane in the observation beam path and containing at least one layer modifying the phase or amplitude, and of a stop arranged in the illumination beam path, wherein the modulator is mounted tiltably and wherein at least a portion of the at least one layer modifying the phase or amplitude is transmissive.

2. The apparatus as defined in Claim 1, wherein the at least one layer of the modulator is configured in such a way that the greatest possible phase shift is already achieved by a slight tilt.

3. The apparatus as defined in Claim 1, wherein the at least one layer comprises glass plates of various glasses.

8. The apparatus as defined in Claim 1, wherein the modulator possesses a defined variable layer configuration.

9. The apparatus as defined in Claim 2, wherein the modulator possesses a defined variable layer configuration.

10. The apparatus as defined in Claim 3, wherein the modulator possesses a defined variable layer configuration.

11. An apparatus for implementing phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in each pupil plane in the observation beam path

and containing at least one layer modifying the phase or amplitude, and of a stop arranged in the illumination beam path, wherein for phase shifting, optical polarization means in combination with retardation plates are present and wherein at least a portion of the at least one layer modifying the phase or amplitude is transmissive.

12. An apparatus for implementing phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in each pupil plane in the observation beam path and containing at least one layer modifying the phase or amplitude, and of a stop arranged in the illumination beam path, wherein various modulators are arranged on a carrier in a manner introducible into the beam path of the microscope and are selectably mounted, tiltably individually or tiltably together with the carrier, on that carrier and wherein at least a portion of the at least one layer modifying the phase or amplitude is non-reflective.

13. A method for implementing a defined phase shift in the implementation of phase-contrast or modulation-contrast observation on microscopes with the aid of a modulator arranged in each pupil plane in the observation beam path and containing at least one layer modifying the phase or amplitude, and of a stop arranged in the illumination beam path of the microscope, wherein the modulator is tilted and wherein the at least one layer modifying the phase or amplitude is transmissive.

EVIDENCE APPENDIX

Exhibit A

Definition of 'lens' from http://www.photonics.com/dictionary, accessed on January 19, 2006.

lens	See PREVIOUS | NEXT term in listing

Definition:

A transparent optical component consisting of one or more pieces of optical glass with surfaces so curved (usually spherical) that they serve to converge or diverge the transmitted rays from an object, thus forming a real or virtual image of that object.

Exhibit B

Definition of 'aperture stop' from http://www.photonics.com/dictionary, accessed on January 19, 2006.

aperture stop	See PREVIOUS | NEXT term in listing

Definition:

A physical constraint, often a lens retainer, that limits the diameter of the axial light bundle allowed to pass through a lens.

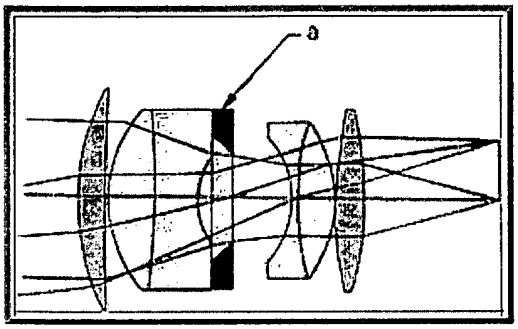

Exhibit C

Definition of 'aperture' from http://www.photonics.com/dictionary, accessed on January 19, 2006.

aperture	See PREVIOUS | NEXT term in listing

Definition:

An opening or hole through which radiation or matter may pass.

Exhibit D

Definitions of 'tilt' from http://www.m-w.com/cgi-bin/dictionary, accessed on January 23, 2006.

tilt

6 entries found for **tilt**.
To select an entry, click on it.

tilt[1,noun]
tilt[2,transitive verb]
tilt[3,noun]
tilt[4,verb]
full tilt
tilt-rotor
Go

Main Entry: [3]**tilt**
Function: *noun*
Etymology: [4]tilt
1 a : a contest on horseback in which two combatants charging with lances or similar weapons try to unhorse each other : JOUST **b** : a tournament of tilts
2 a : DISPUTE, CONTENTION **b** : SPEED -- used in the phrase *full tilt*
3 a : the act of tilting : the state or position of being tilted **b** : a sloping surface **c** : SLANT, BIAS <a *tilt* toward military involvement>
4 : any of various contests resembling or suggesting tilting with lances
- tilt *adjective*

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tilt

6 entries found for **tilt**.
To select an entry, click on it.

tilt[1,noun]
tilt[2,transitive verb]
tilt[3,noun]
tilt[4,verb]
full tilt
tilt-rotor
Go

Main Entry: [4]**tilt**
Function: *verb*
Etymology: Middle English *tulten, tilten* to cause to fall: akin to Swedish *tulta* to waddle
transitive senses
1 : to cause to have an inclination
2 a : to point or thrust in or as if in a tilt <*tilt* a lance> **b** : to charge against <*tilt* an adversary>
intransitive senses
1 a : to move or shift so as to lean or incline : SLANT **b** : to incline, tend, or become drawn toward an opinion, course of action, or one side of a controversy
2 a : to engage in a combat with lances : JOUST **b** : to make an impetuous attack <*tilt* at social evils>
- tilt·able /'til-t&-b&l/ *adjective*
- tilt·er *noun*